

DEFENSE ACQUISITION UNIVERSITY
BUSINESS, COST ESTIMATING, & FINANCIAL MANAGEMENT DEPARTMENT

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TEACHING NOTE

COST AS AN INDEPENDENT VARIABLE (CAIV)
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INTRODUCTION

CAIV is basically an acquisition process intended to integrate proven successful business-related practices with promising new DoD initiatives to obtain superior, yet reasonably priced, warfighting capabilities. Traditionally, the success of acquisition programs has been judged by their accomplishments with respect to three parameters: *cost, schedule and performance*. Of these, performance usually received the most emphasis, and therefore was treated as a "fixed" or "independent" variable. Schedule and cost were allowed to vary to achieve some desired level of performance. In an era of shrinking defense budgets, DoD has adopted the CAIV philosophy of treating **cost** as the independent variable of the three, allowing performance and schedule to vary somewhat in an attempt to keep weapon systems affordable. DoD Directive 5000.1¹ states that:

"...acquisition managers shall establish aggressive but realistic objectives for all programs and follow through by working with the user to trade off performance and schedule, beginning early in the program (when the majority of costs are determined).

IMPLEMENTATION OF CAIV

In a USD(AT&L) letter dated 19 Jan 02, Secretary Aldridge required all ACAT I programs to:

“incorporate a CAIV plan and to have an evolutionary acquisition or spiral development implementation plan in place” by the end of September 2002. Guidelines developed by The Reduction in Total Ownership Cost (RTOC) working group are “intended as general guidelines to assist the process, but not constrain it.”

¹ This teaching note refers to the defense acquisition process defined in the 2002 versions of DoD Directive 5000.1, DoD Instruction 5000.2, and DoD 5000.2-R. “Grandfathered” programs are those programs that continue to operate under the process described in the 1996 versions of DoDD 5000.1 and DoD 5000.2-R. Not incorporated are expected changes to DoD Directive 5000.1 and DoD Instruction 5000.2 currently in draft form. It is expected that DoD 5000.2-R will be cancelled and probably rewritten as a guidance manual.

The cognizant Overarching Integrated Product Team (OIPT) is to establish a Cost/Performance IPT (CPIPT) for that program. The CPIPT will normally be led by the Program Manager (PM) or the PM's representative, and will include representation from the user, costing, analysis, and budgeting communities as a minimum. The CPIPT may also include representation from industry, if the program's stage of development and relevant laws permit it.

Once a Mission Needs Statement (MNS) has been approved, a CAIV strategy will be formulated as part of the acquisition strategy to set cost objectives. By program initiation, the PM shall have established life-cycle cost or total ownership cost objectives for the program, including objectives for Research and Development cost, Procurement cost, Military Construction cost, Operating and Support cost, and Disposal cost. *[Note: Description of these cost categories is included in the Funds Management teaching note entitled "Introduction to Cost Analysis"]*. At each subsequent milestone review, the PM will reassess these cost objectives and the progress made toward achieving them.

In the January 1999 document, "Into the 21st Century: A Strategy for Affordability," the Defense Systems Affordability Council announced a goal of lowering the Total Ownership Cost of defense products. A key means of achieving this goal is to "surpass or achieve CAIV targets that are 20% to 50% below historical norms for at least 50% of systems in acquisition by FY 2000."

The CAIV process recognizes that the best time to reduce life-cycle costs is early in the acquisition process (e.g., it makes sense for the PM to spend development funds in order to save a greater amount of production costs and/or operating and support costs later). The CAIV process is most effective before the approval of the Operational Requirements Document (ORD) and cost/performance tradeoff analyses should be conducted before an acquisition approach is finalized. The CPIPT plays a key role in assessing tradeoffs and recommending to the PM performance or engineering and design changes that reduce cost without causing breaches of the thresholds specified in the approved ORD and the Acquisition Program Baseline (APB). The PM is empowered to act on these recommendations without additional permission from higher levels. If the CPIPT identifies tradeoffs that would cause a breach of the ORD or APB, the leader of the CPIPT must notify both the PM and the OIPT leader. The PM is then responsible for bringing such proposed changes before the ORD and/or APB approval authorities for decision.

One of the keys to making CAIV work is to provide incentives (and remove disincentives) to both government and contractor personnel. For example, to incentivize the contractor, CAIV savings should be shared equitably between the government and the contractor. Government PMs can be incentivized by permitting the PM to retain at least some internally generated savings within the program, perhaps for use on program enhancements, further cost reduction efforts, or to improve operations of the program office. For government personnel (both civilian and military), there should be provisions for awards to individuals and groups for notable contributions to achieving cost reductions. An example of removing disincentives to cost savings efforts concerns perception of "failed" efforts. The chain of command should be willing to accept risk-taking when the potential for future payoff is high. Managers who take the risk and work

hard in that risky environment should not be penalized for their less-successful attempts at cost savings if their efforts fail for reasons beyond their control.

CAIV AND ACQUISITION REFORM

CAIV is both an acquisition reform itself and a collection of other acquisition reforms. To accomplish the CAIV goal of reducing system life-cycle cost, many individual acquisition reform initiatives may be employed. An incomplete list of these initiatives includes using commercial standards and processes; commercial or non-developmental components; commercial best practices; performance capability specifications; and contracting strategy techniques that will allow sharing of cost savings with contractors who bring in the program at or below previously established aggressive cost objectives. Another example of an acquisition reform initiative that contributes to the accomplishment of CAIV is the Single Process Initiative (SPI). Under SPI, a contractor is allowed to use a single process within his own facilities to manage and report on all defense contracts (rather than having multiple different processes and reports called for in each separate contract), thereby reducing management and overhead costs for each contract.

Although some initiatives may require a waiver from current statute(s), acquisition reform philosophy encourages PMs to seek such waivers to reduce program costs.

DIFFERENCES BETWEEN CAIV AND DTC

Some veterans of defense acquisition may interpret CAIV as a new name for the *Design to Cost (DTC)* concept. Although the two are similar in many ways, there are significant differences. Probably the biggest difference between DTC and CAIV is in the focus of the two concepts. Under DTC, the focus tended to be on designing the system to minimize development and production costs for a particular performance level. Under CAIV, performance (and schedule) can be traded to achieve cost goals. Under DTC, little or no attention was given to reducing post-production operating and support (O&S) costs, while under CAIV, the focus is on life-cycle cost as a whole. Thus, production cost might actually increase under CAIV if the use of more expensive materials or more precise manufacturing processes would result in greater reductions of maintenance or operating costs in the O&S phase.

Another key difference between DTC and CAIV is in the use of the CPIPT to recommend tradeoffs. Under DTC, the PM was largely alone in making decisions regarding trades to reduce production cost. Under CAIV, the users are intimately involved in making trade recommendations as a result of their participation on the CPIPT.

CAIV SUCCESSES

Reports have been received from the following programs indicating their success in implementing CAIV:

Program

Experience

MIDS	Redesigned portion of the system at half the previously estimated cost with 100 % performance and improved reliability.
JDAM	Achieved required performance at less than half of the originally estimated cost
PLGR	Achieved 100 % performance at 63 % of the previously estimated cost by focusing on the system's cost
WCMD	Achieved 100 % performance with 25 % savings in EMD phase and 33 % savings in production
HARPOON	After nearly 20 years of production, cut production unit cost by nearly 25 %
Fuel Tank Truck	Used CAIV initiative to create an innovative approach to acquiring fuel tank trucks; reduced time required to acquire and receive delivery of "customized" fuel trucks from more than a year to less than a month with corresponding savings in processing costs plus satisfying customer needs quicker.

ADDITIONAL CAIV RESOURCES

This teaching note presents just a summary of the CAIV concept. For those seeking additional information on the subject, the following resources are highly recommended:

- **CAIV Website (<http://www.caiv.com>)** - Provides hot links to OSD and Service web sites containing key CAIV information and documents.
- **Defense Acquisition Deskbook (<http://www.deskbook.osd.mil>)** (also available on CD-ROM) - An electronic knowledge presentation system providing the most current acquisition policy and guidance for all DoD Services and Agencies. (The Defense Acquisition Deskbook is being transferred to Defense Acquisition University – see [www://deskbooktransition.dau.mil](http://www.deskbooktransition.dau.mil) for the latest updates)

SUMMARY

CAIV is an acquisition philosophy that emphasizes keeping system life cycle cost within an established range by trading the other system acquisition variables of performance or schedule.

Since a significant portion of a system's life cycle cost is fixed by its design, the optimum time to apply CAIV principles is early in the life of an acquisition program.